



US009411436B2

(12) **United States Patent**
Shaw et al.

(10) **Patent No.:** **US 9,411,436 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **INPUT DEVICE BACKLIGHTING**

(56) **References Cited**

(71) Applicant: **Microsoft Technology Licensing, LLC**,
Redmond, WA (US)

U.S. PATENT DOCUMENTS

(72) Inventors: **Timothy C. Shaw**, Sammamish, WA
(US); **Richard D. Harley**, Sammamish,
WA (US); **Xuezhong Wu**, Bellevue, WA
(US); **Bradley R. Martin**, Auburn, WA
(US); **Kurt A. Jenkins**, Sammamish,
WA (US)

5,489,900	A	2/1996	Cali et al.
5,942,733	A	8/1999	Allen et al.
6,239,786	B1	5/2001	Burry et al.
6,758,615	B2	7/2004	Monney et al.
6,977,352	B2	12/2005	Oosawa
7,557,312	B2	7/2009	Clark et al.
7,736,042	B2	6/2010	Park et al.
8,232,963	B2	7/2012	Orsley et al.
8,330,061	B2	12/2012	Rothkopf et al.
8,330,742	B2	12/2012	Reynolds et al.
8,378,972	B2	2/2013	Pance et al.
8,403,576	B2	3/2013	Merz

(73) Assignee: **Microsoft Technology Licensing, LLC**,
Redmond, WA (US)

(Continued)

OTHER PUBLICATIONS

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 363 days.

“Visus Photonics—Visionary Technologies New Generation of Pro-
duction Ready Keyboard-Keypad Illumination Systems”, Available
at: <[http://www.visusphotonics.com/pdf/appl_keypad_keyboard_](http://www.visusphotonics.com/pdf/appl_keypad_keyboard_backlights.pdf)
[backlights.pdf](http://www.visusphotonics.com/pdf/appl_keypad_keyboard_backlights.pdf)>, May 2006, pp. 1-22.

(Continued)

(21) Appl. No.: **14/033,290**

Primary Examiner — Tina Wong

(22) Filed: **Sep. 20, 2013**

(74) *Attorney, Agent, or Firm* — Qudus Olaniran; Judy Yee;
Micky Minhas

(65) **Prior Publication Data**

US 2015/0084865 A1 Mar. 26, 2015

(57) **ABSTRACT**

(51) **Int. Cl.**
G02B 6/26 (2006.01)
G06F 3/0346 (2013.01)
G06F 3/023 (2006.01)
H04M 1/22 (2006.01)
G06F 1/16 (2006.01)

Input device backlighting techniques are described. In one or more implementations, an input device includes a light guide configured to transmit light, a sensor assembly having a plurality of sensors that are configured to detect proximity of an object as a corresponding one or more inputs, a connection portion configured to form a communicative coupling to a computing device to communicate the one or more inputs received by the sensor assembly to the computing device, and an outer layer. The outer layer has a plurality of indications of inputs formed using openings in the outer layer such that light from the light guide is configured to pass through the openings to function as a backlight. The outer layer also has a plurality of sub-layers arranged to have increasing levels of resistance to transmission of the light from the light guide, one to another.

(52) **U.S. Cl.**
CPC **G06F 3/0346** (2013.01); **G06F 1/1632**
(2013.01); **G06F 3/023** (2013.01); **H04M 1/22**
(2013.01); **H01H 2219/062** (2013.01)

(58) **Field of Classification Search**
None

See application file for complete search history.

20 Claims, 8 Drawing Sheets

